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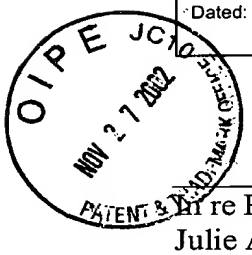
Dated: November 27, 2002 Signature: (Monica Thomas)



Docket No.: HO-P01952US0
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Julie A. Bearcroft, et al.

Application No.: 09/517,981 Group Art Unit: 3738

Filed: March 3, 2000 Examiner: B. Pellegrino

For: SHAPED PARTICLE AND COMPOSITION FOR BONE DEFICIENCY AND METHOD OF MAKING THE PARTICLE

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TECHNOLOGY CENTER R3700

DECLARATION UNDER 37 CFR §1.132

Dear Sir:

I, Edward Margerrison, Ph.D, do hereby depose and say as follows:

1. I am a British citizen residing at 8851 Kateland Street, Germantown, TN, USA.

2. I am an employee of the assignee of the above-referenced patent application, and I have read the contents of said application.

3. I am the Director of Research in the Orthopaedics Global Business Unit at Smith + Nephew. I am skilled in the area of bone substitute methods and compositions. A resume describing my experience is attached to this declaration.

The present invention is not obvious in view of Ersek. Ersek teaches using a number of these granules as exemplified in Figures 5 and 6 as an injectable material when used with a suitable carrier. Not only does Ersek make no mention of an array of granules, but it teaches that the function of the irregularities is to prevent dislodgement of the granules following tissue ingrowth. It does not teach that an interlocking of granules itself can allow for both migration resistance and tissue ingrowth, and this teaches away from the present invention. Ersek teaches migration resistance dependent on injection in solution and allowing fibroblasts to anchor the particles into place (see, for example, Col. 3, L39-41; Col 2, L27-31; Col. 4, L12-27). In the present invention, the granules themselves prevent migration by interlocking in an array, which is reflected in claim 1 as it currently stands. Ersek teaches away from the present invention by teaching encapsulation of each particle. As presented in the interview with the Examiner and as stated in claim 1 ("particle will accept...one extremity of an adjacent...particle to facilitate interlocking...in an array"), the particle of the present

invention "for use in a treating a bone deficiency" would function poorly if encapsulated, particularly by fibroblasts. Therefore, Applicants' invention is not obvious in view of Ersek.

The present invention is also not obvious in view of Sheppard. Sheppard teaches a square cross-sectional configuration, in contrast to Applicants' circular cross-sectional configuration. The design of the cross-section of the present invention is not obvious in view of Sheppard's design, given that Sheppard clearly describes an advantage of having the square cross-section. More importantly, this so-called advantage of having the square cross-section as described in Sheppard would be a detriment to the present invention, because the square cross-section provides a tightly packed array wherein the flat planar surfaces of an extremity of one particle are in contact with the flat planar surfaces of an extremity of an adjacent particle, thereby providing a poor configuration for treating a bone deficiency as described in the currently pending claims of the present invention.

Sheppard teaches the aggregate or array of particles as per Figures 5 and 6. The purpose of the square cross-sectional area in Sheppard is to increase the strength of a composite material with the array being surrounded by a matrix material. The composite is likely to have an increased strength and fracture toughness compared with other means of reinforcing composite structures. With the exception of a brief divergent passage on Page 12, Lines 13-19, the array as shown in Figures 5 and 6 is described as having essentially no open porosity within the structure, owing to the extremely high reticulated structure that the "StarJack" shape gives. For example, on page 7, line 1:

> "One aspect of the present invention in an aggregate having a unique three dimensional shape theoretically capable of packing to a 100% density without any void volume and using only one size fraction."

The particles of the present invention cannot theoretically pack to 100%, nor would it be desirable to do so. The presently pending claims are to methods to treat a bone deficiency, and packing to such as density would be counter-productive to Applicants' goal, clearly making it non-obvious.

Moreover, it is mentioned that the arrangement described in Sheppard can often be achieved by mixing a number of those granules and applying vibration through *e.g.* a mechanical of ultrasound means. The advantage of the circular cross-section of the present invention is to

reduce the potential for forming this reticulated structure so that a number of the individual granules together will retain a configuration amenable to treating a bone deficiency. On Page 12 line 28, Sheppard states:

> "We believe the StarJack, tetratwin and tetrastar represent novel classes of aggregate shapes with reticulated geometries marked by, for example: (1) the ability of same-class components to nest uniformly.....(3) plane-based coordination opportunities for aggregate that are an improvement on the point-to-point-based coordination of spherical and random shapes or the line-to-line-based coordination of fibrous reinforcement."

Applicants assert that one skilled in the art would not recognize that the array of particles of the present invention illustrated in Figure 2 in the instant specification are in a "nested" array (see point (1) from the Sheppard passage). Instead, a skilled artisan recognizes that the term "nested" means "packed compactly together," and in the context of the teachings of Sheppard for flat surfaces of the arms in a "plane-based coordination", the packing would be so compact as to teach away from the configuration of the array as taught by the Applicants. Again, it is the circular cross-sectional configuration of the present invention's particles in an array that facilitates treatment of a bone deficiency, and the shape of the Sheppard granules would not suggest it is amenable to doing so.

Thus, in summary, I hereby assert that Sheppard teaches away from the present invention and does not make Applicants' invention obvious.

4. I hereby declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 22nd NOVEMBER 2002 _____

Ed Margerrison

Edward Ernest Charles Margerrison

Contact Details

- Home:

  8851 Kateland St, Germantown, TN, USA.

- Work:

  Smith & Nephew Orthopaedics
- 1450 E Brooks Rd, Memphis, TN 38116.
- Tel: (901) 399 6713
- Fax: (901) 399 6020.
  email: ed.margerrison@smith-nephew.com

Personal Information

- Nationality: British.
- Age: 37.
- Place of Birth: Shifnal, Shropshire, UK..
- Passport number: 017006692.
- Marital status: Married with 1 daughter.

Education

1983 - 1987 The Queen's College, Oxford
Oxford, UK

BA (Hons) in Biochemistry

- First degree at the University of Oxford covering all principle aspects of biochemistry including genetics, molecular biology and clinical biochemistry.

1987 - 1991 St George's Hospital Medical School,
University of London London, UK

PhD in Biochemistry/ Molecular Biology

- Thesis title: "The molecular Biology of *Candida albicans* and *Staphylococcus aureus* DNA Topoisomerase II".

Professional experience

2002 – Present Smith & Nephew plc.
Orthopaedics Global Business Unit, Memphis, TN

Director of Research

I am currently responsible for the whole research programme for Smith and Nephew Orthopaedics, including full budgetary and management control. I have approximately 35 direct and indirect staff.

1997 – 2002 Smith & Nephew plc.

Smith & Nephew Group Research Centre
York Science Park
Heslington
York YO10 5DF
UK

Phone +44 (0) 1904 824000
Fax +44 (0) 1904 824004
E-mail ed.margerrison@smith-nephew.com

Group Research Centre, York, UK

Research Programme Manager Orthopaedics.

- My role was to manage and direct the research programme on behalf of the Orthopaedics Global Business Unit located in Memphis, TN. The research programme is comprised of approximately 6 research projects, each of which has a project manager reporting to me. I was answerable to the Senior Vice President of R&D in Memphis, TN.
- My specific responsibilities included:
- Management of all orthopaedics staff at S&N York. There are currently 18 research scientists and 1 administrative assistant. I am directly responsible for all management aspects of these staff including recruitment, performance management, salary review etc. Additionally, one research team of 6 engineers and scientists who are located at Memphis also report to me directly.
- Budgetary management and control of 2 separate budgets comprising approximately $3 million in York and $1 million in Memphis.
- Setting the strategy and tactical direction of the research programme for endorsement by the Business Unit Executive Staff.
- Overall project management and portfolio analysis of the Orthopaedic research programme.
- Intellectual property generation and management of patents etc arising from the research programme.
- Technology evaluation and acquisition.
- University and Company collaborations and research alliances.

1996 - 1997 Smith & Nephew plc.
Group Research Centre, York, UK

Head of Computing

As head of computing, I was responsible for a department of 4 staff who ran the IT services for the site, including IT training and maintenance of the network. During the course of this job, I worked with a number of Value Added Resellers to design and install a new network for the site.

1993 - 1996 Smith & Nephew plc.
Group Research Centre, York, UK

Project Planner

I was recruited into this position from Fisons Pharmaceuticals primarily to establish project planning and project management techniques for S&N's corporate R&D site. The Group Research Centre had recently relocated to York

Smith & Nephew Group Research Centre
York Science Park
Heslington
York YO10 5DF
UK

Phone +44 (0) 1904 824000
Fax +44 (0) 1904 824004
E-mail ed.margerrison@smith-nephew.com

from the South of England, and had subsequently appointed project managers who were the main contacts with the business units. My role was to establish methods of project planning and monitoring, establishing cost reports for the business units, and resource allocation and planning across the 4 research programmes. The role included a close working relationship with the project managers, and interaction with senior management both within GRC and at the business units.

1992 – 1993 Fisons Pharmaceuticals
Loughborough, UK.

Project Planner

- My employment at Fisons was within the strategic analysis unit whose responsibilities included the both the tactical and strategic planning for the R&D division. My specific responsibilities included:
- Project planning of all CNS development projects
- Planning of all clinical trial supplies and logistics thereof, including stability studies and QA release for clinical trials.
- Planning of late stage development projects for transfer to the manufacturing division.

During this time, I gained experience of the use of project management and project planning within an R&D environment

1982 - 1983 ICI Pharmaceuticals Division
Alderley Park, Cheshire, UK

Pre-University Student.

- One year employment with ICI Pharmaceuticals R&D division.

During the year, I joined one of the research teams at ICI Pharmaceuticals (now Astra-Zeneca) investigating the role of new chemical entities in the treatment of psoriasis.

Smith & Nephew Group Research Centre
York Science Park
Heslington
York YO10 5DF
UK

Phone +44 (0) 1904 824000
Fax +44 (0) 1904 824004
E-mail ed.margerrison@smith-nephew.com